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Remarks

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Claims 1-21 are pending in the application.

Claim 1-21 are rejected under 35 U.S.C. 112, ¶1, as failing to comply with the written description requirement.

Claims 1, 2, 4, 9-11, 14 and 16-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Chou et al. ("Chou") (U.S. Patent Application Publication No. 2005/0280886).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chou in view of Farries et al. ("Farries") (U.S. Patent No. 5,127,928).

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chou.

Claims 1, 10, 18 and 20 have been amended to clarify Applicants' invention.

New claims 22 and 23 have been added to depend from claim 1 and claim 18, respectively. No new matter has been added.

Each of the various rejections and objections are overcome by amendments that are made to the specification, drawing, and/or claims, as well as, or in the alternative, by various arguments that are presented.

Entry of this Amendment is proper under 37 CFR § 1.116 since the amendment: (a) places the application in condition for allowance for the reasons discussed herein; (b) does not raise any new issue requiring further search and/or consideration since the amendments amplify issues previously discussed throughout prosecution; (c) satisfies a requirement of form asserted in the previous Office Action; (d) does not present any additional claims without canceling a corresponding number of finally rejected claims; or (e) places the application in better form for appeal, should an appeal be necessary. The amendment is necessary and was not earlier presented because it is made in response to arguments raised in the final rejection. Entry of the amendment is thus respectfully requested.

Any amendments to any claim for reasons other than as expressly recited herein as being for the purpose of distinguishing such claim from known prior art are not being made with an intent to change in any way the literal scope of such claims or the range of equivalents for such claims. They are being made simply to present language that is better in conformance with the form requirements of Title 35 of the United States Code

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or is simply clearer and easier to understand than the originally presented language. Any amendments to any claim expressly made in order to distinguish such claim from known prior art are being made only with an intent to change the literal scope of such claim in the most minimal way, i.e., to just avoid the prior art in a way that leaves the claim novel and not obvious in view of the cited prior art, and no equivalent of any subject matter remaining in the claim is intended to be surrendered.

Also, since a dependent claim inherently includes the recitations of the claim or chain of claims from which it depends, it is submitted that the scope and content of any dependent claims that have been herein rewritten in independent form is exactly the same as the scope and content of those claims prior to having been rewritten in independent form. That is, although by convention such rewritten claims are labeled herein as having been "amended," it is submitted that only the format, and not the content, of these claims has been changed. This is true whether a dependent claim has been rewritten to expressly include the limitations of those claims on which it formerly depended or whether an independent claim has been rewritten to include the limitations of claims that previously depended from it. Thus, by such rewriting no equivalent of any subject matter of the original dependent claim is intended to be surrendered. If the Examiner is of a different view, he is respectfully requested to so indicate.

Rejection Under 35 U.S.C. 112, First Paragraph

Claims 1-21 are rejected under 35 U.S.C.112, ¶1, as failing to comply with the written description requirement.

Claims 1, 10, 18 and 20 have been amended to delete the words "third order", thus overcoming the rejection under 35 U.S.C. 112, ¶1. Applicants respectfully request that the rejection be withdrawn.

Rejection Under 35 U.S.C. 102

Claims 1, 2, 4, 9-11, 14 and 16-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Chou. The rejection is traversed.

Claims 1, 10 and 18 have been amended to clarify Applicants' invention.

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Anticipation requires the presence, in a single prior art reference, disclosure of each and every element of the claimed invention, arranged as in the claim. Chou fails to disclose each and every element of the claimed invention, as arranged in independent claim 1.

Specifically, Chou fails to teach or suggest at least the following features recited in independent claim 1:

"a first optical combiner for combining at least two optical pump signals to produce a combined pump signal, and a second optical combiner for combining an input data signal with the combined pump signal to produce a combined signal; a non-linear optical element for imparting a non-linear effect on the combined signal;" (emphases added)

Examiner cited Chou's Fig. 4, paragraphs 68-71 and paragraphs 23-24 and 44 as teaching the various features relating to the first and second optical combiners and the non-linear optical element.

Applicants respectfully disagree. The cited portions of Chou, along with Figs. 3A-B, teach a two-channel optical mixer 75 based on difference frequency generation (DFG) process. Input signal beam 94 interacts with beam 90 via DFG to produce a first output beam 96, and the input beam 94 interacts with beam 92 via DFG to produce a second output beam 98 (paragraph 70).

Chou teaches only a single optical component used in the DFG process, i.e., the optical mixer 75, which is a quasi-phase-matching (QPM) grating 70 fabricated in a nonlinear optical material. Thus, Applicants submit that the optical mixer 75 is analogous to the non-linear optical element of Applicants' claim 1. However, there is simply no teaching in the cited portions of Chou of a first optical combiner for combining at least the two pump signals, or a second optical combiner for combining an input data signal with the combined pump signal.

Thus, Chou fails to disclose each and every element of the claimed invention, as arranged in Applicants' independent claim 1.

As such, independent claim 1 is not anticipated by Chou and is patentable under 35 U.S.C. 102. Independent claim 18 recites relevant limitations similar to those recited in independent claim 1 and, as such, for at least the same reasons discussed above, claim 18 is also not anticipated by Chou and is patentable under 35 U.S.C. 102.

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Since all of the dependent claims that depend from the independent claims include all the limitations of the respective independent claim from which they ultimately depend, each such dependent claim is also allowable over Chou.

Therefore, Applicants' claims 1, 2, 4, 9-11, 14 and 16-21 are allowable over Chou under 35 U.S.C. 102. The Examiner is respectfully requested to withdraw the rejection.

Rejection Under 35 U.S.C. 103(a)

Claim 8

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chou in view of Farries. The rejection is traversed.

This ground of rejection applies only to a dependent claim, and is predicated on the validity of the rejection under 35 U.S.C. 102 given Chou. Since the rejection under 35 U.S.C. 102 given Chou has been overcome, as described hereinabove, and there is no argument put forth by the Office Action that Farries supplies that which is missing from Chou to render the independent claims anticipated, this ground of rejection cannot be maintained.

Therefore, Applicants' claim 8 is allowable over Chou and Farries under 35 U.S.C. 103. The Examiner is respectfully requested to withdraw the rejection.

Claim 15

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chou. The rejection is traversed.

This ground of rejection applies only to a dependent claim, and is predicated on the validity of the rejection under 35 U.S.C. 102 given Chou. Since the rejection under 35 U.S.C. 102 given Chou has been overcome, as described hereinabove, this ground of rejection cannot be maintained.

Therefore, Applicants' claim 15 is allowable over Chou under 35 U.S.C. 103. The Examiner is respectfully requested to withdraw the rejection.

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New Claims

New claims 22 and 23 have been added to depend on claim 1 and claim 18, respectively. Specifically, claim 22 recites that the non-linear optical element "generates a number of optical bands based on a simultaneous three-signal interaction of the two optical pump signals and the input data signal." Claim 23 recites a similar feature.

Subject matter for both claims is fully supported in the original specification, for example, on p. 7, lines 24-33, which teaches that the removal of the signal from either of the optical pumps causes the simultaneous collapse of the corresponding idler bands and a loss of signal gain. As such, no new matter has been added.

Since claim 22 depends from claim 1 and claim 23 depends from claim 18, both claims 22 and 23 are patentable over Chou for at least the same reasons set forth above in connection with claims 1 and 18.

Furthermore, the non-linear effect in Chou is different from that of Applicants' invention, because the output beams 96 and 98 in Chou are generated based on two separate interactions: one between signal 94 and pump beam 90, and another between signal 94 and pump beam 92. That is, Chou does not teach a non-linear effect based on simultaneous three-signal interaction of the two pump beams and the signal beam. As such, claims 22-23 are also patentable over Chou.

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It is respectfully submitted that the Office Action's rejections have been overcome and that this application is now in condition for allowance. Reconsideration and allowance are, therefore, respectfully solicited.

If, however, the Examiner still believes that there are unresolved issues, the Examiner is invited to call Eamon Wall at (732) 530-9404 so that arrangements may be made to discuss and resolve any such issues.

Respectfully submitted,

Dated: 5/30/07

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